Conservation Impact of Prepaid Metering

Motivation and Incentives for Pre-Pay Systems

INITIAL FINDINGS | NOVEMBER 15 2013

NRECA
A Touchstone Energy® Cooperative
CRN
Cooperative Research Network

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Motivation and Incentives for Pre-Pay Systems

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The National Rural Electric Cooperative Association

NRECA is the national service organization for more than 900 not-for-profit rural electric cooperatives and public power districts providing retail electric service to more than 42 million consumers in 47 states and whose retail sales account for approximately 12 percent of total electricity sales in the United States.

NRECA's members include consumer-owned local distribution systems — the vast majority — and 66 generation and transmission (G&T) cooperatives that supply wholesale power to their distribution cooperative owner-members. Distribution and G&T cooperatives share an obligation to serve their members by providing safe, reliable and affordable electric service.

About CRN

NRECA's Cooperative Research Network™ (CRN) manages an extensive network of organizations and partners in order to conduct collaborative research for electric cooperatives. CRN is a catalyst for innovative and practical technology solutions for emerging industry issues by leading and facilitating collaborative research with co-ops, industry, universities, labs, and federal agencies.

CRN fosters and communicates technical advances and business improvements to help electric cooperatives control costs, increase productivity, and enhance service to their consumer-members. CRN products, services and technology surveillance address strategic issues in the areas:

- Cyber Security
- Consumer Energy Solutions
- Generation & Environment
- Grid Analytics
- Next Generation Networks
- Renewables
- Resiliency
- Smart Grid

CRN research is directed by member advisors drawn from the more than 900 private, not-for-profit, consumer-owned cooperatives who are members of NRECA.

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FOREWORD

The National Rural Electric Cooperative Association (NRECA) has organized the NRECA-U.S. Department of Energy (DOE) Smart Grid Demonstration Project (DE-OE0000222) to install and study a broad range of advanced Smart Grid technologies in a demonstration that involves 23 electric cooperatives in 11 states. For purposes of evaluation, the technologies deployed have been classified into three major sub-classes, each consisting of four technology types, the status of which have been reported in the Interim Technology Report of April 2013:

Enabling Technologies:	Advanced Metering Infrastructure
	Meter Data Management Systems
	Telecommunications
	Supervisory Control and Data Acquisition
Demand Response:	In-Home Displays & Web Portals
	Demand Response Over AMI
	Prepaid Metering
	Interactive Thermal Storage
Distribution Automation:	Renewables Integration
	Smart Feeder Switching
	Advanced Volt/VAR Control
	Conservation Voltage Reduction

To demonstrate the value of implementing the Smart Grid, NRECA has prepared a series of single-topic studies to evaluate the merits of project activities. The study designs have been developed jointly by NRECA and DOE. This document is the initial report on one of those topics, based upon the progress of the activity to date. The project team will be monitoring the progress of the various cooperative activities during the remaining term of the demonstration to close identified information gaps and identify additional information that will be of benefit to the merit evaluation. This document and the other single-topic studies then will be updated, as appropriate, for consideration in the final Technology Performance Report at the close of the Smart Grid Demonstration Project.

INTRODUCTION

This document is a review of prepayment programs under development at three distribution cooperatives as a part of the National Rural Electric Cooperative Association-U.S. Department of Energy (NRECA-DOE) Smart Grid Demonstration Project (SGDP). The intent of the document is to provide an overall status for each program, as well as compare and contrast the results of each. The three cooperatives are EnergyUnited (EU), Delta-Montrose Electric Association (DMEA), and Kotzebue Electric Association (KEA).

In June 2012, the NRECA's Cooperative Research Network (CRN) published a Prepaid Metering Analytical Report. The contents of that report include:

- Introduction
- What is Prepayment?
- Technology Overview
- Prepayment Program Policies
- Prepayment Program Marketing
- Evaluating the Business Case for Prepayment
- Prepayment and Energy Efficiency
- Ten Utility Questions
- Ten Vendor Questions
- Prepayment Program List
- Utility Surveys
- Vendor Lists
- Future Prepayment Options
- Prepayment Program Structure
- Conclusion

The intent of the June 2012 report was to give utilities necessary information about defining and running a prepayment program. Many of the sections of that report can be readily correlated with this review of the SGDP activity. To read both reports will give one not only the basis for the issues and considerations of prepayment but also a more detailed look at specific utilities and their programs. However, this review of the three SGDP prepay activities is a standalone document, and the previous report is not a prerequisite. As further information on the progress of implementation becomes available, the results may be incorporated into the prior report.

EnergyUnited (EU)

EnergyUnited is the second largest provider of residential electricity in North Carolina and among the 20 largest electric cooperatives in the United States. With more than a quarter-million consumers in parts of 19 North Carolina counties, EU is in the fast-growing Piedmont section of North Carolina—including parts of Charlotte, Greensboro, and Winston-Salem. Headquartered in Statesville, NC, with offices in seven cities and towns, EnergyUnited's service area stretches the entire breadth of the state, from the Virginia border to Mecklenburg County.

EU was formed in 1998, when electrical cooperative members overwhelmingly voted to consolidate Crescent and Davidson Electric Membership Corporations. These two established cooperatives had served members for almost 75 years.

Delta-Montrose Electric Association (DMEA)

Delta-Montrose Rural Power Lines Association was organized in Colorado in August, 1938. Three years earlier, the Rural Electrification Administration (REA) was established by Executive Order 7037, signed by Franklin D. Roosevelt, for the purpose of promoting rural electrification. At that time, only a small percentage of American farms had electricity because power companies located in the city had not found it economically feasible to construct lines to sparsely populated areas. The REA was established to act as a banker, providing low-interest loans and technical assistance to cooperatives.

Electricity first flowed through Delta-Montrose Rural Power Lines Association's distribution system in May 1939 to serve 250 customers in the Pea Green area of Colorado, near Delta. Customers in the Delta, Hotchkiss, and Paonia areas were added in the following years.

Western Colorado Power Company (WCPC), an investor-owned utility, also provided electricity to the same territory as Delta-Montrose Rural Power Lines Association. Frequently, its secondary and primary lines and those of WCPC ran parallel to one another.

In 1971, the Public Utilities Commission of Colorado ordered an exchange of customers to correct this situation and consolidate certain areas. Two thousand customers were affected in this consolidation.

In May 1975, Delta-Montrose Rural Power Lines Association purchased a portion of the territory being served by WCPC, adding approximately 10,000 customers and 730 miles of line to its system. Because it no longer served only rural areas, the "Rural Power Lines" portion of its name was dropped and the cooperative became Delta-Montrose Electric Association (DMEA).

Kotzebue Electric Association (KEA)

Kotzebue Electric Association in Alaska has been around only since the 1950s. During its time in business, KEA has helped bring electric power to all of Kotzebue. Electric power was first was made available via small generators owned and operated by Kotzebue businesses. Arctic Literage, Alaska Communications Systems (now Alascom), Rotman Stores, the hospital ,and Archie Ferguson were among those who supplied and sold excess power from their business generators to homes that were located within throwing distance.

Around 1949, a group of Kotzebue individuals began sending out feelers to find out how to start a local electric power cooperative. This group began the process of obtaining a loan from REA.

At around the same time plans were being made to launch KEA, Havenstrike Mining Company of Candle brought generators to Kotzebue. These generators had been used by the company in its gold mining operations. Two generators—75 and 100 kva—were set up. A few distribution lines also were set up by Havenstrike to deliver electricity to several homes that had been without power.

KEA also was beginning to set up its operations. Its first generator—50 kva—was set up near the present Alascom site. In the mid-1950s, KEA started setting its own distribution lines; the first was built to serve members along Front Street.

In late February 1956, KEA signed and executed a loan contract and mortgage with REA. By the end of that year, test runs on generators in KEA's new plant were completed and 65 consumer/members were on line. Red Mullally became the first General Manager.

At around the same time, KEA bought Havenstrike's electric business and consolidated the two operations.

Since then, KEA has grown along with its members' needs. Along the way, an addition was made to the original plant, and new generators have served a growing demand for electricity. In 1987, an office building was added near the plant, and KEA's main office moved into new quarters.

In recent years, KEA has spent much time and energy on developing new sources of energy. Because of the high costs of fuel and declining support from the state legislature to keep energy

costs in rural Alaska at reasonable levels, KEA has worked to become a pioneer in the use of wind energy in an Arctic environment; the wind energy program provides an alternative source of energy, with the potential to keep electric costs at affordable levels.

Today, KEA has 840 members, and generates more than 22 million kWh per year. Getting electricity into the rural areas of Alaska has been a triumph not only of technology, but also of the people involved, both then and now.

PROGRAM OVERVIEWS

The following sections describe the technical, policy, and marketing aspects of the Prepayment Programs at each utility.

EnergyUnited

EU has an active prepayment program, with more than 1,400 current participants. With more than 120,000 members, this level of participation represents roughly 1% of its meter base.

Technical Architecture

The systems involved in offering prepayment to EU members are the Customer Information System (CIS) from Cayenta, a division of N. Harris Computer Corporation, and the advanced metering infrastructure (AMI) solution from Cooper Power Systems. EnergyUnited is also implementing MeterSense, a meter data management solution (MDMS) from North|Star Utilities Solutions, but it is not yet fully implemented and does not play any material role in the prepayment program.

Cayenta was specifically contracted by EU to develop the capability to support prepayment as part of its core CIS offering. EnergyUnited specifically wanted to avoid implementing a third-party system for prepayment that would need to be integrated with and run alongside the Cayenta CIS. The high-level architecture of the system is shown in **Figure 1**.

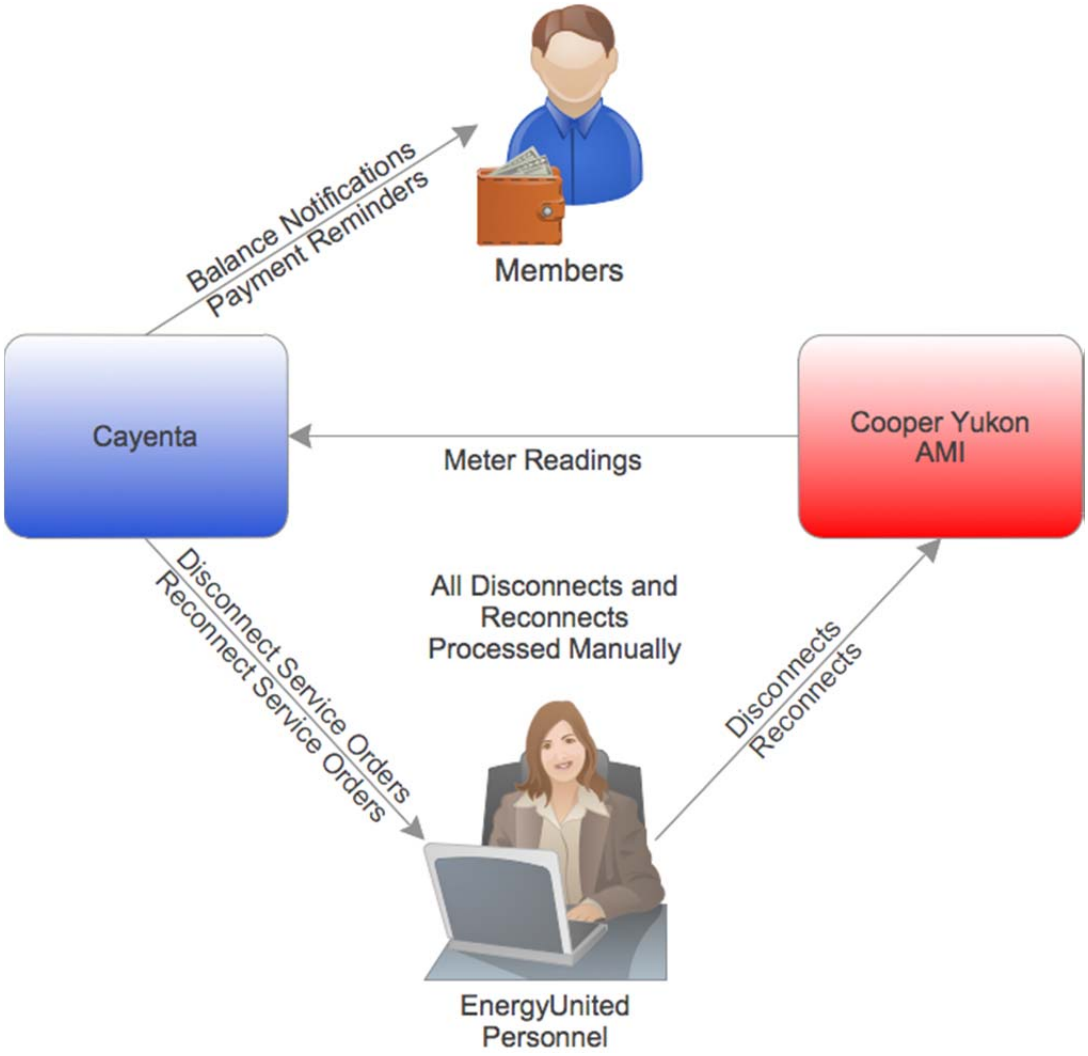


Figure 1. Cayenta/EU CIS High-Level Architecture

The figure shows a non-typical approach to disconnects, as most programs are integrated to the point that these operations can be handled automatically, without the need for human intervention. However, EnergyUnited is not comfortable with the reliability of the AMI communications at this time and has elected to process them manually to ensure that the operations are completed correctly.

All prepayment customers have remote disconnect devices installed at their residences. EnergyUnited has a hybrid advanced metering system that includes a combination of power line communication (PLC) and radio frequency (RF) meters. At all PLC meter locations, a remote disconnect collar is installed. These collars are devices installed under the actual service meter and house the disconnect switch. Collars were the first embodiment of remote disconnect before meter manufacturers integrated the disconnect switch into the meter. EnergyUnited will eventually move to these meters with the disconnects under glass. At RF advanced metering locations, EU already uses the remote disconnect under glass.

All communications with the customer are done via email, text messaging, phone calls, and members logging into a portal. Dedicated in-home display devices are not supported.

Policies

EnergyUnited has taken a unique approach to defining the parameters under which its program operates. Traditionally, prepayment is a program of interest to new members who want to avoid large deposits and those whose accounts are in arrears. When members in arrears move to prepayment, a percentage of each amount tendered is taken and applied to the debt. Members are allowed to pay off their debt in this manner without falling further behind.

EnergyUnited has structured its program to cater to new members virtually exclusively. Existing members with any amounts in arrears must satisfy their debt obligations before being allowed onto prepayment. The incentive for existing members to enroll in the Prepayment Program thus is not present.

EnergyUnited does waive the deposit for new members enrolling in the Prepayment Program. This is a decided advantage over having to pay as much as several hundred dollars to get service. The costs of signing up for prepayment are as follows:

Table 1.Costs of EU Prepayment Sign-Up

Description	Cost
Service must have a minimum balance of $50 to start	$50.00
Service fee for disconnect collar installation is waived if member is paying a connection fee. The connection fee is:	$30.00
Cooperative membership fee	$5.00
Total Signup Cost	**$85.00**

Once service has been established, members receive daily updates on their balances via the update methodologies they choose. When an account gets to within five days or less of depletion based on daily usage, a daily notification is sent via phone call, text message, email, or any combination of these, based on the member's preferences.

If the account is disconnected due to lack of funds, the member must make the following payment amount to be reconnected:

Table 2. EU Reconnection Costs

Description	Cost
Minimum balance of $50 for reconnect	$50.00
Reconnect fee	$25.00
Payment of any amount below zero balance	$?
Total Minimum Reconnect Cost	$75.00

The concept of a reconnect fee associated with prepayment is unusual but not unheard of. The reconnect fee for the Prepayment Program is significantly less than the regular reconnect fee. The reconnect fee and the minimum balance criteria serve to act as a deterrent to disconnects. This is especially important to EnergyUnited, since the disconnect/reconnect processes involve significant manual support. Without these fees, the program might become too labor intensive, given the current support requirements.

Other policies associated with the program are summarized as follows:

1. Prepayment is offered only to residential and small business members.
2. Prepayment enrollees are on the same rate as regular bill payment customers.
3. Prepayment is not offered to any service location where there is a demand charge component to the bill.
4. Disconnects are performed once daily, with the following stipulations:
   a. On Monday after all drop-box payments are processed.
   b. No disconnects on weekends or holidays (because of manual processing of disconnects).
5. Reconnects are performed 24/7 via the utility dispatch center.
6. No disconnects are performed when the temperature is below freezing or above 105 degrees.

Marketing

EnergyUnited has done extensive work in promoting the program. EU has branded the Prepayment Program as the EnergyAdvantage (EA) program. Many utilities have seen this branding as an effective way to reference and market such a program. However, it should be noted that this in no way serves to disguise or hide that it is prepayment. According to member service personnel at EnergyUnited, members readily understand this fact.

The following are the various ways in which the program has been promoted.

Website

Figure 2 shows the promotion of the Prepayment Program web page on the EU website.

Figure 2. EU Prepayment Program Web Page

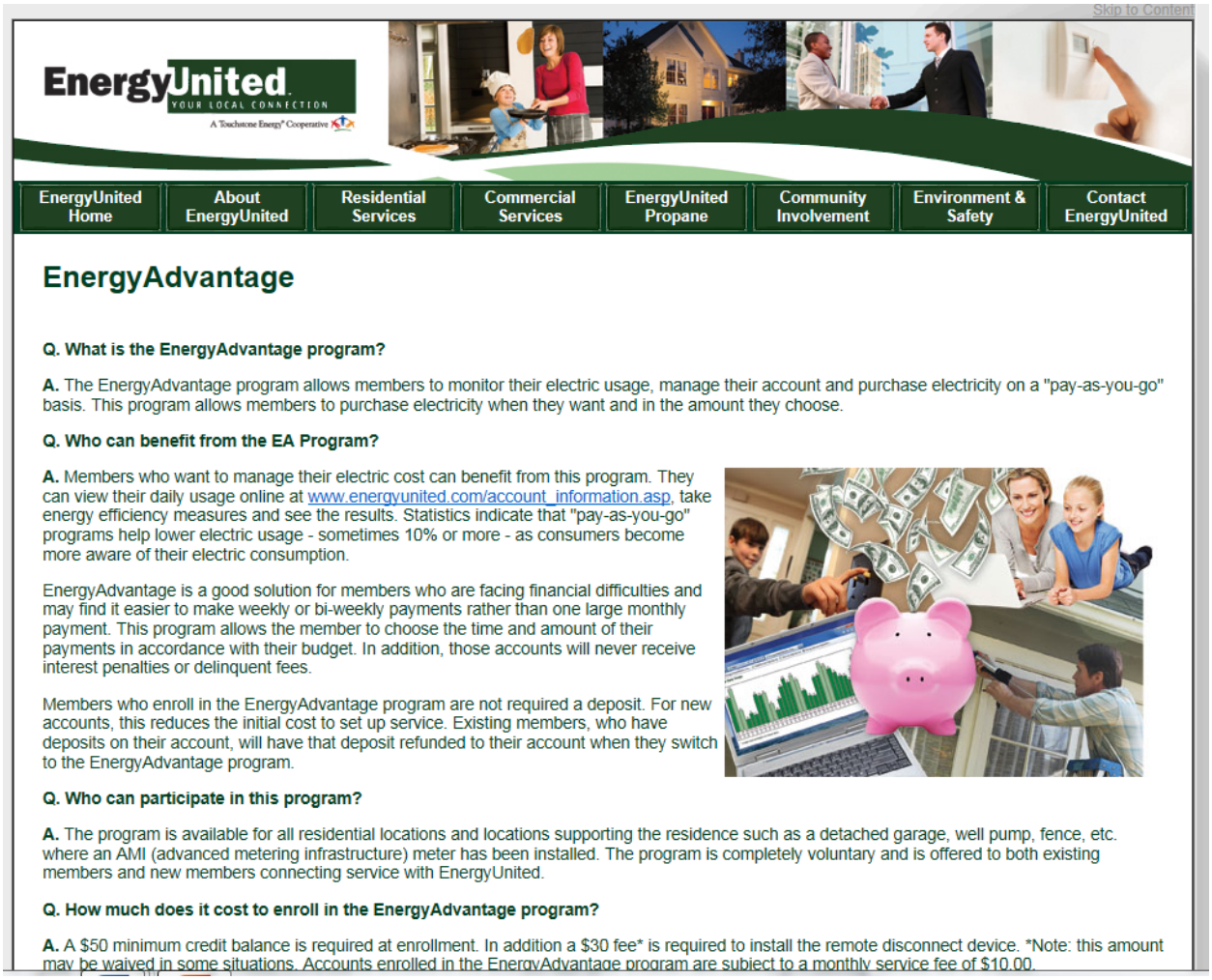


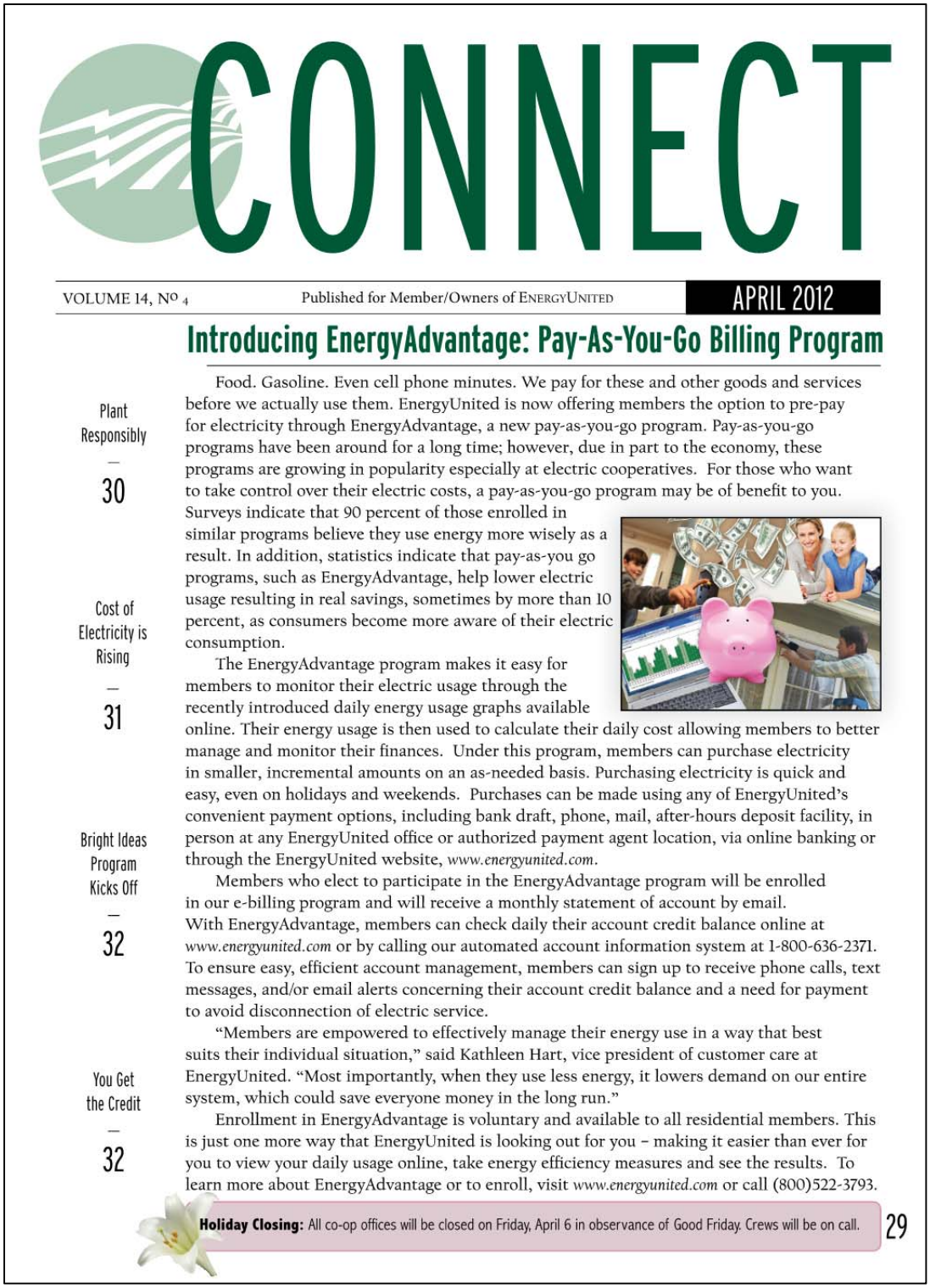
Figure 2. EU Prepayment Program Web Page (continued)

The web page can be accessed at:

https://www.energyunited.com/energy_advantage.asp.

Member Newsletter

Figure 3 shows a news item contained in the April 2012 EnergyUnited newsletter.



CONNECT

VOLUME 14, Nº 4 Published for Member/Owners of ENERGYUNITED APRIL 2012

Introducing EnergyAdvantage: Pay-As-You-Go Billing Program

Plant Responsibly — 30

Cost of Electricity is Rising — 31

Bright Ideas Program Kicks Off — 32

You Get the Credit — 32

Food. Gasoline. Even cell phone minutes. We pay for these and other goods and services before we actually use them. EnergyUnited is now offering members the option to pre-pay for electricity through EnergyAdvantage, a new pay-as-you-go program. Pay-as-you-go programs have been around for a long time; however, due in part to the economy, these programs are growing in popularity especially at electric cooperatives. For those who want to take control over their electric costs, a pay-as-you-go program may be of benefit to you. Surveys indicate that 90 percent of those enrolled in similar programs believe they use energy more wisely as a result. In addition, statistics indicate that pay-as-you go programs, such as EnergyAdvantage, help lower electric usage resulting in real savings, sometimes by more than 10 percent, as consumers become more aware of their electric consumption.

The EnergyAdvantage program makes it easy for members to monitor their electric usage through the recently introduced daily energy usage graphs available online. Their energy usage is then used to calculate their daily cost allowing members to better manage and monitor their finances. Under this program, members can purchase electricity in smaller, incremental amounts on an as-needed basis. Purchasing electricity is quick and easy, even on holidays and weekends. Purchases can be made using any of EnergyUnited's convenient payment options, including bank draft, phone, mail, after-hours deposit facility, in person at any EnergyUnited office or authorized payment agent location, via online banking or through the EnergyUnited website, *www.energyunited.com*.

Members who elect to participate in the EnergyAdvantage program will be enrolled in our e-billing program and will receive a monthly statement of account by email. With EnergyAdvantage, members can check daily their account credit balance online at *www.energyunited.com* or by calling our automated account information system at 1-800-636-2371. To ensure easy, efficient account management, members can sign up to receive phone calls, text messages, and/or email alerts concerning their account credit balance and a need for payment to avoid disconnection of electric service.

"Members are empowered to effectively manage their energy use in a way that best suits their individual situation," said Kathleen Hart, vice president of customer care at EnergyUnited. "Most importantly, when they use less energy, it lowers demand on our entire system, which could save everyone money in the long run."

Enrollment in EnergyAdvantage is voluntary and available to all residential members. This is just one more way that EnergyUnited is looking out for you – making it easier than ever for you to view your daily usage online, take energy efficiency measures and see the results. To learn more about EnergyAdvantage or to enroll, visit *www.energyunited.com* or call (800)522-3793.

Holiday Closing: All co-op offices will be closed on Friday, April 6 in observance of Good Friday. Crews will be on call.

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Figure 3. News Story About the Prepayment Program in the EU Newsletter

Bill Insert

Figure 4 shows a bill insert created to promote the EU Prepayment Program.

EnergyAdvantage, our newest billing option, a pay-as-you-go plan

EnergyUnited introduces a new billing option - EnergyAdvantage - that allows members to monitor their electricity usage, manage their account and purchase electricity on a pay-as-you-go basis.

Monitor Electricity Usage

Members may view their daily usage online, take energy efficiency measures and see the results. Statistics indicate that pay-as-you-go programs help lower electric usage - sometimes 10% or more - as consumers become more aware of of their electric consumption.

Account Management

EnergyUnited makes it easy and convenient to monitor both electric usage and the account credit balance online at *www.energyunited.com.*

To ensure easy, efficient account management, members may sign up to receive phone calls, text messages, and/or email alerts concerning account credit balances and a need for payment to avoid disconnection of electric service.

Purchase Electricity

EnergyAdvantage allows you to purchase electricty when you want and in the amount you choose. Purchasing electricity is quick and easy, even on holidays and weekends. Purchases can be made using any of EnergyUnited's convenient payment options - by bank draft; phone; mail; in person at any EnergyUnited office or authorized payment agent location; via online banking; or the EnergyUnited web site.

At EnergyUnited - we're looking out for you. As times and needs change, we offer innovative ways for you to take control of your electric bill. To learn more about the EnergyAdvantage billing option, contact Customer Care at 800.522.3793. ENU40i

Figure 4. Bill Insert Promoting the EU Prepayment Program

Delta-Montrose Electric Association

DMEA is not very far along in the rollout of its Prepayment Program. Currently, it has three DMEA employees working on prepayment in a test phase.

Technical Architecture

The systems involved in offering prepayment to DMEA members are the CIS from the National Information Solutions Cooperative (NISC) and the AMI solution from Aclara. DMEA is in the midst of transitioning from Aclara's MDMS solution to the package offered by NISC. However, this system does not play an active role in the prepayment service.

NISC and Aclara are vendors experienced in prepayment and played important roles in the definition of the interface requirements as part of the MultiSpeak specification. Their integrations appear to be solid, with DMEA personnel having a high degree of confidence in the solution. Therefore DMEA expects to allow the technology to automatically process disconnects and reconnects without human intervention or oversight. **Figure 5** shows a simplified high-level diagram of the architecture.

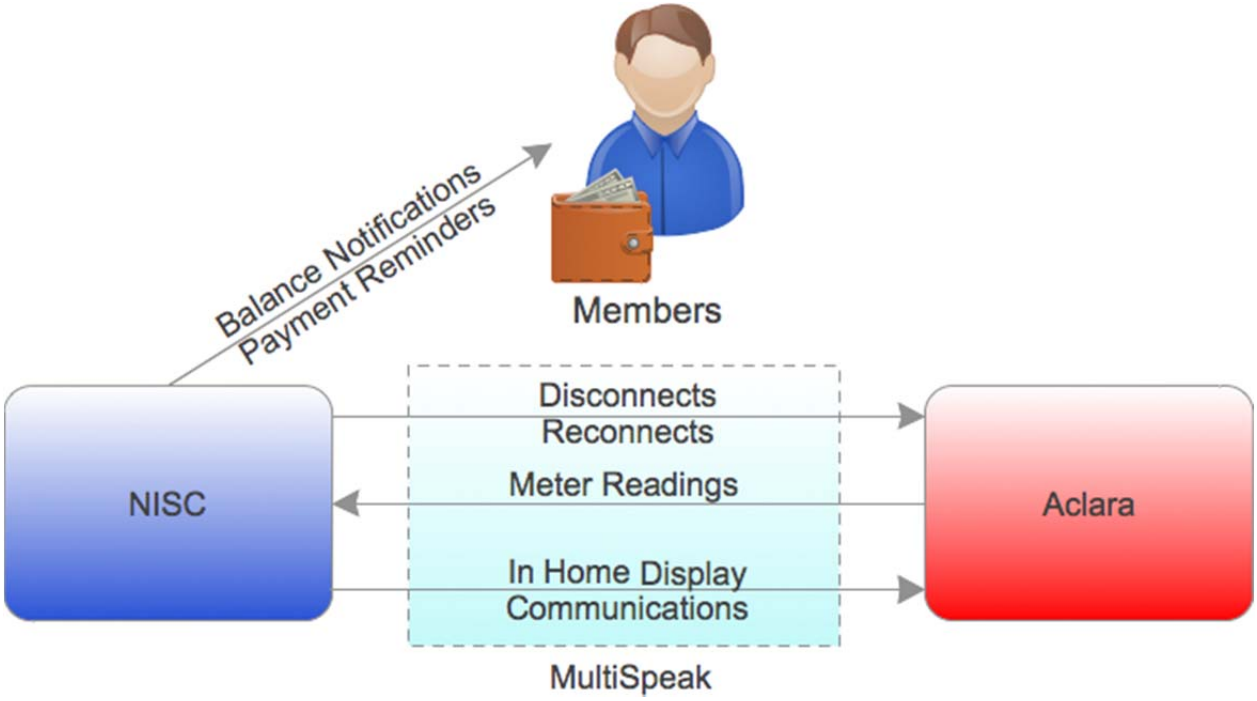

Figure 5. DMEA Prepayment System High-Level Architecture

As can be seen from the figure, DMEA will be utilizing in-home displays (IHD) as an optional communications channel to members. While many programs have eliminated this option in favor of email and text messaging, DMEA has chosen to include it due to the significantly rural aspect of its territory.

In addition to the email, text messaging, and IHD options, NISC offers an app that can be downloaded by iPhone and Android users. For more information, see the following: http://www.smarthubapp.com/index.htm.

This app is in use by the DMEA personnel working on prepayment, with very positive results.

All prepayment customers will have disconnect collars installed at their residences. DMEA would like to eventually move to meters with integrated disconnects, which are currently available.

Policies

Because DMEA is not ready to roll out its program, many of its policies are not yet well formed. However, its positioning of the program would appear to be on the other end of the spectrum from that of EnergyUnited.

DMEA will encourage those members who are in arrears to join the Prepayment Program and allow their debts to be paid off over time by taking a percentage of each amount tendered and applying it to the debt. Conversely, DMEA does not currently have a required deposit to get service. Therefore, it is unclear as to whether new members will elect to sign up for prepayment initially.

Other proposed policies associated with the program are summarized as follows:

1. Prepayment is offered only to residential and small business members.
2. Prepayment enrollees are on the same rate as regular bill payment customers.
3. Prepayment if not offered to any service location where there is a demand charge component to the bill.
4. Disconnects are to be performed once daily, including weekends. It is as yet unclear if disconnects will be processed on holidays.
5. Reconnects are performed 24/7.
6. No disconnect moratoriums are expected due to weather/temperature extremes. This is consistent with existing disconnect policies.
7. DMEA is considering some incentives for members to increase their level of sign-up to the program.
8. There is not expected to be any additional monthly or reconnect fee associated with the program.

Marketing

Marketing efforts for the program have been the subject of many discussions but the actual plans have not yet been formulated.

Kotzebue Electric Association

KEA is not very far along in the rollout of its Prepayment Program. While the program was anticipated to be rolled out in summer 2013, it likely will not be rolled out until spring 2014.

Technical Architecture

The systems involved in offering prepayment to KEA members are the CIS from PCS and AMI solution from Landis+Gyr. PCS and Landis+Gyr both are vendors experienced in the various aspects of prepayment. KEA expects to allow the technology to automatically process disconnects and reconnects without human intervention or oversight. A simplified high-level diagram of the architecture is shown in **Figure 6**.

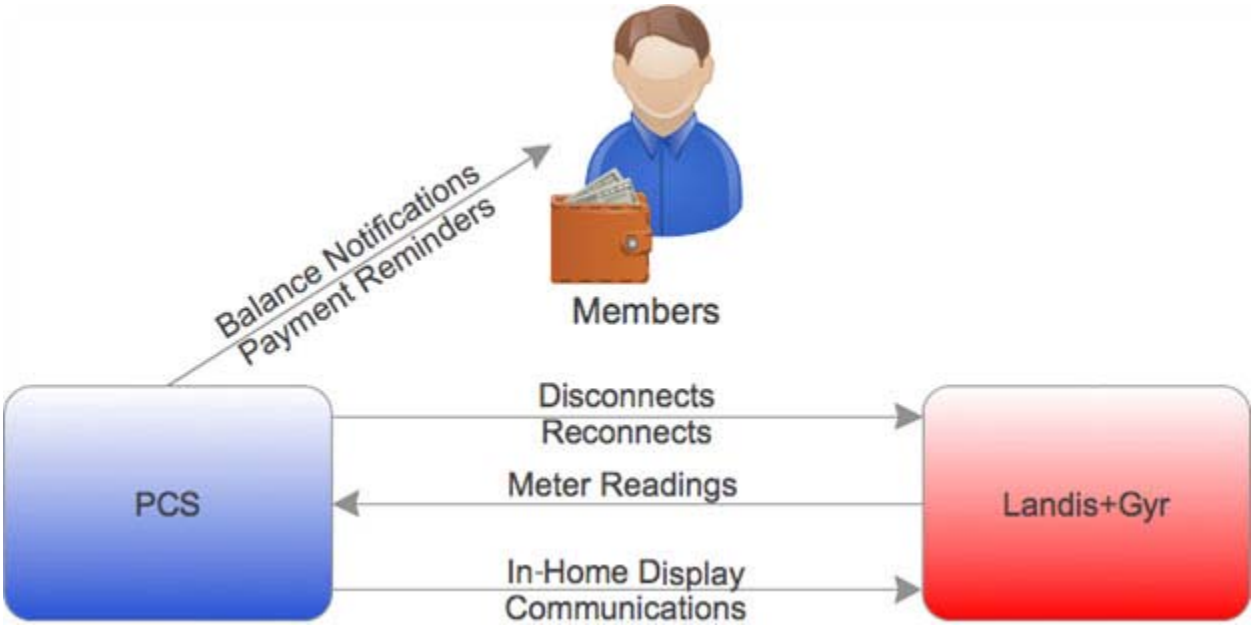

Figure 6. KEA Prepayment System High-Level Architecture

As can be seen from the figure, KEA will be utilizing IHDs as an optional communications channel to members. KEA has chosen to include this option in large part to assist its members in making decisions about their power consumption.

Policies

Because KEA is not ready to roll out its program, many of its policies are not yet well formulated. KEA will encourage those members who are in arrears to join the prepayment program and allow that debt to be paid off over time by taking a percentage of each amount tendered and applying it to the debt. In addition, KEA will encourage temporary residents to utilize the service as an alternative to regular bill payment and thus avoid a deposit.

Due to the weather extremes in the KEA territory, a service limiter feature will be utilized in the winter months in lieu of a hard disconnect. Service limiter functionality works in the following manner:

- A wattage limit is set for the premise based on historical usage, with the expectation that it will allow basic lifeline service but not unlimited usage.

- When the wattage level is exceeded, the service is temporarily disconnected.
- After the prescribed time period, typically a few minutes, the service is reconnected.
- After reconnection, there is a period of stabilization, typically also a few minutes, to allow the load to level out before the system starts monitoring the wattage level and the process begins all over again.

Other proposed policies associated with the program are summarized as follows:

1. Prepayment is offered only to residential and small business members.
2. Prepayment enrollees are on the same rate as regular bill payment customers.
3. Prepayment if not offered to any service location where there is a demand charge component to the bill.
4. Disconnects are to be performed once daily, and only during open-office hours.
5. Reconnects are performed during open-office hours.
6. Balance updates likely will be sent to members only on a weekly basis, unless the balance falls within the parameters requiring more frequent notification.
7. No additional monthly or reconnect fee is expected to be associated with the program.

Marketing

Marketing efforts for the program have been the subject of many discussions but the actual plans have not yet been formulated.

STATISTICS – ENERGYUNITED

Because the programs at DMEA and KEA are not yet in operation, we present here some of the statistics gathered on the EA program from EnergyUnited.

Program Size

As of early September 2013, EnergyUnited has implemented 2,554 prepayment contracts. At the same time, there are 1,442 active accounts. As expected, based on the program policies, only five of the 2,554 total contracts were obtained from existing members. All other prepayment contracts are with new members.

The purchase frequency of the accounts is shown in **Figure 7**.

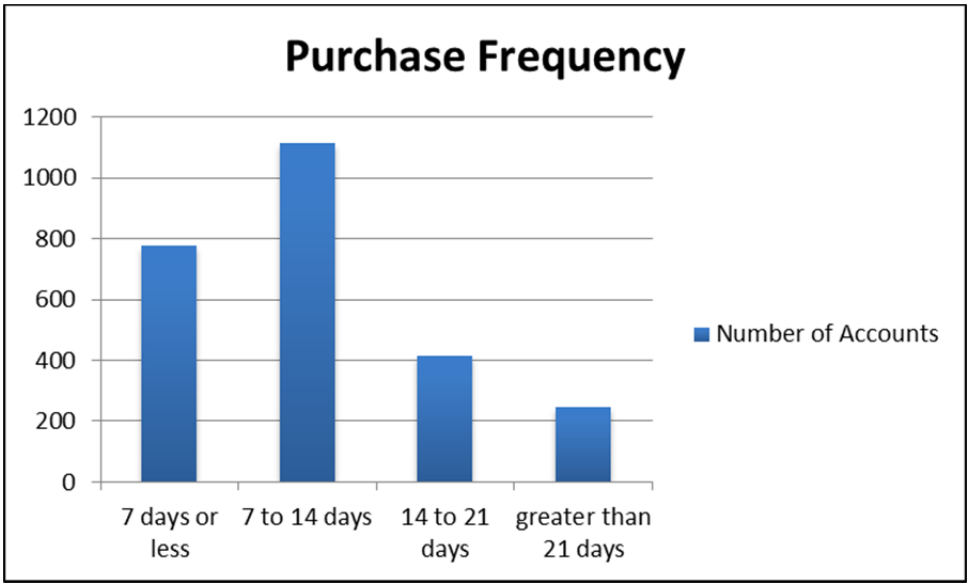

Figure 7. Purchase Frequency of EU Prepayment Program Accounts

As expected in the service of prepayment, and as shown in **Table 3**, very few members make purchases on a monthly basis. Virtually all of the accounts have taken advantage of the ability to make purchases more frequently.

Table 3. Purchase Frequency of EU Prepayment Accounts, Percentage by Time Period

Time Period	Percentage
7 days or less	30%
14 days or less	74%
21 days or less	90%

Disconnects

Because of the implementation of the reconnect fee, EU thought that the members on prepayment might be avoiding disconnects better than those in other programs. However, EnergyUnited is processing, on average, about 141 disconnects per month, with an average of 17 being disconnected more than once per month and no more than three times per month. Members were disconnected more frequently during the hot summer months.

Outbound Communications

With balance updates and low balance reminders being sent to members on a daily basis, EU has a very high volume of daily outbound communications. On some days, as many as 700 phone calls are made.

Payment Types

One of the long-held beliefs regarding prepayment is that a program must have a way to accept cash payments on a 24/7 basis. The reasons are twofold. The 24/7 requirement is based on the fact that a member must have the ability to reconnect at any time. Even in cases when disconnects occur only during regular business hours, EU cannot predict when the member might discover the outage. Therefore, a means of reconnection on demand is deemed essential to a prepayment program.

The issue around being able to accept cash is based on the fact that many members might not have any type of banking relationship and operate strictly on a cash basis. The advent of prepaid credit cards has created opportunities for members to make payments online and via other outlets without a banking affiliation. While the information available for this report does not allow us to draw any conclusions on this issue, it is interesting to note how members are making their purchases in the program.

EU supports four different payment mechanisms:

- Office locations taking cash, checks, and credit cards
- Third-party providers (convenience stores) taking cash and checks
- Interactive Voice Response (IVR) taking checks and credit cards
- Online systems taking checks and credit cards

Note that debit cards are supported everywhere that credit cards are accepted.

The data set used for the following analysis consisted of daily transaction totals for each type of transaction from May 1, 2012 to August 23, 2013. In the case of office transactions, credit card transactions are broken out separately.

Total Transactions

Figure 8 shows the total amount of transactions for the period by payment mechanism.

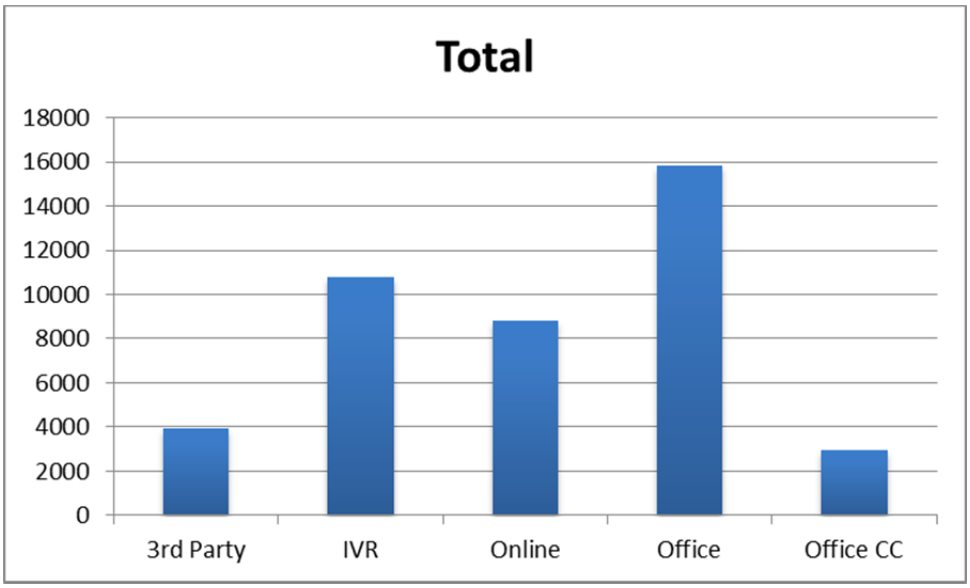

Figure 8. Number of EU Prepayment Program Transactions, by Payment Mechanism

From this figure, we can see that cash and check transactions at office locations exceeded all other transaction types. Also, all of the third-party transactions consisted of either cash or checks. Unfortunately, the data available do not indicate the percentage of these transactions that are cash or checks. However, it is reasonable to assume that prepayment transactions are heavily cash based.

Transaction Trends

Figure 9 shows how transactions have trended in the entire data set.

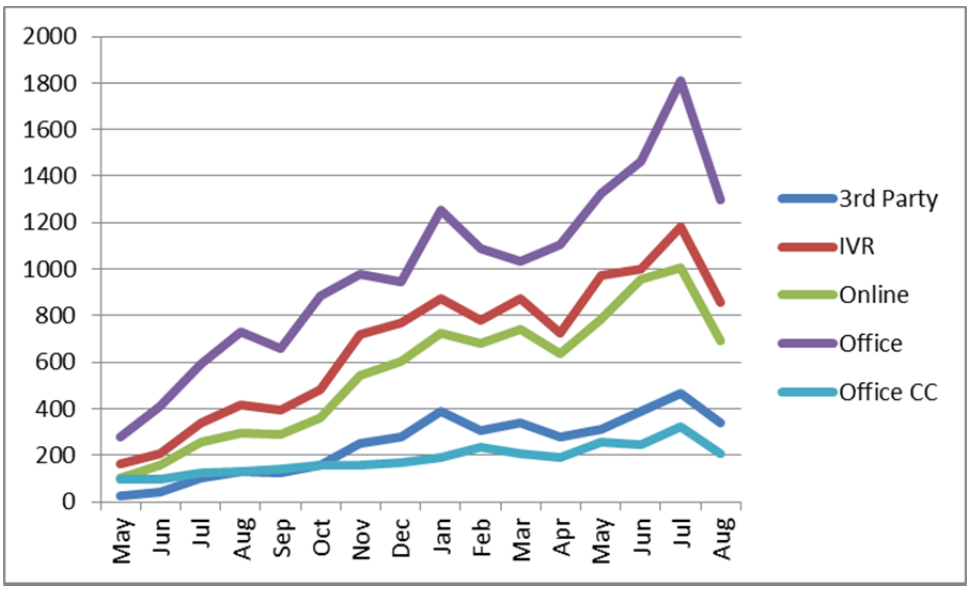

Figure 9. EU Prepayment Program Transaction Trends

It is interesting to note how all of the payment methods trended rather consistently over this time period, with the growth of office credit card payments being somewhat flatter than the others.

Holiday Transactions

The transaction analysis also examined the total transactions for all universally recognized holidays for the period, as shown in **Figure 10**.

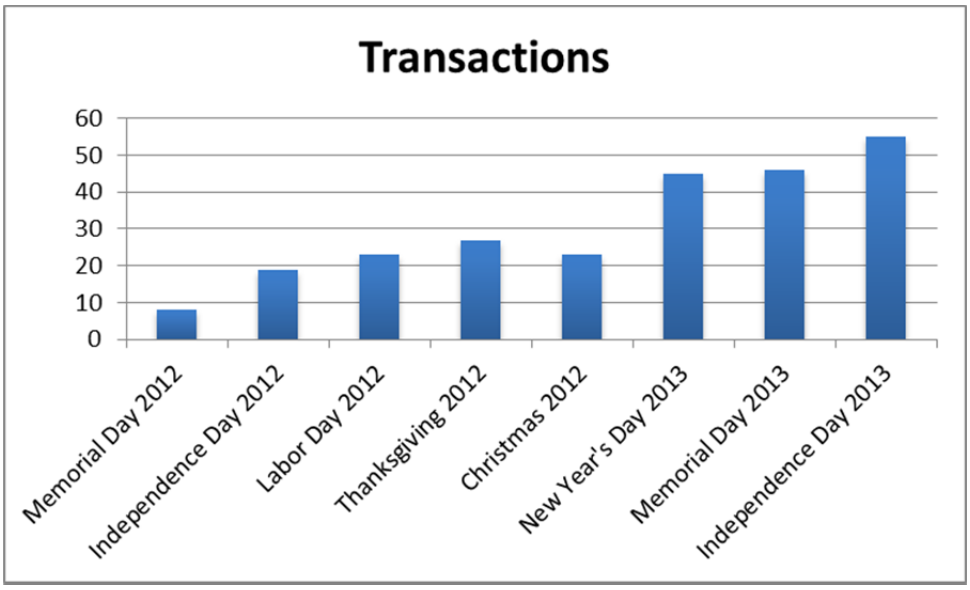

Figure 10. Transaction Trends for the EU Prepayment Program, by Holiday

It is difficult to draw any specific conclusions from these data, other than to say that members will initiate transactions at any time. Holiday transactions must be supported in ways that prevent members from being disconnected. EU's menu of transaction options supports the 24/7 need. As to cash transactions, third-party outlets (convenience stores) handled cash transactions on most of these holidays; some transactions of that type are included in the figure.

Energy Efficiency

The statistical and anecdotal expectations of prepayment have been that the program produces a natural energy conservation effect. The savings typically are somewhere in the 5% to 10% range. The hope was that this program would add to the statistical data showing that prepayment does indeed result in energy efficiency and conservation. However, because of the policies associated with the program, only five existing EnergyUnited members have converted to prepayment. Therefore, there can be no really meaningful conclusions from the data. The lone account that had a reasonable amount of usage both before and after going on prepayment is shown in **Figure 11**.

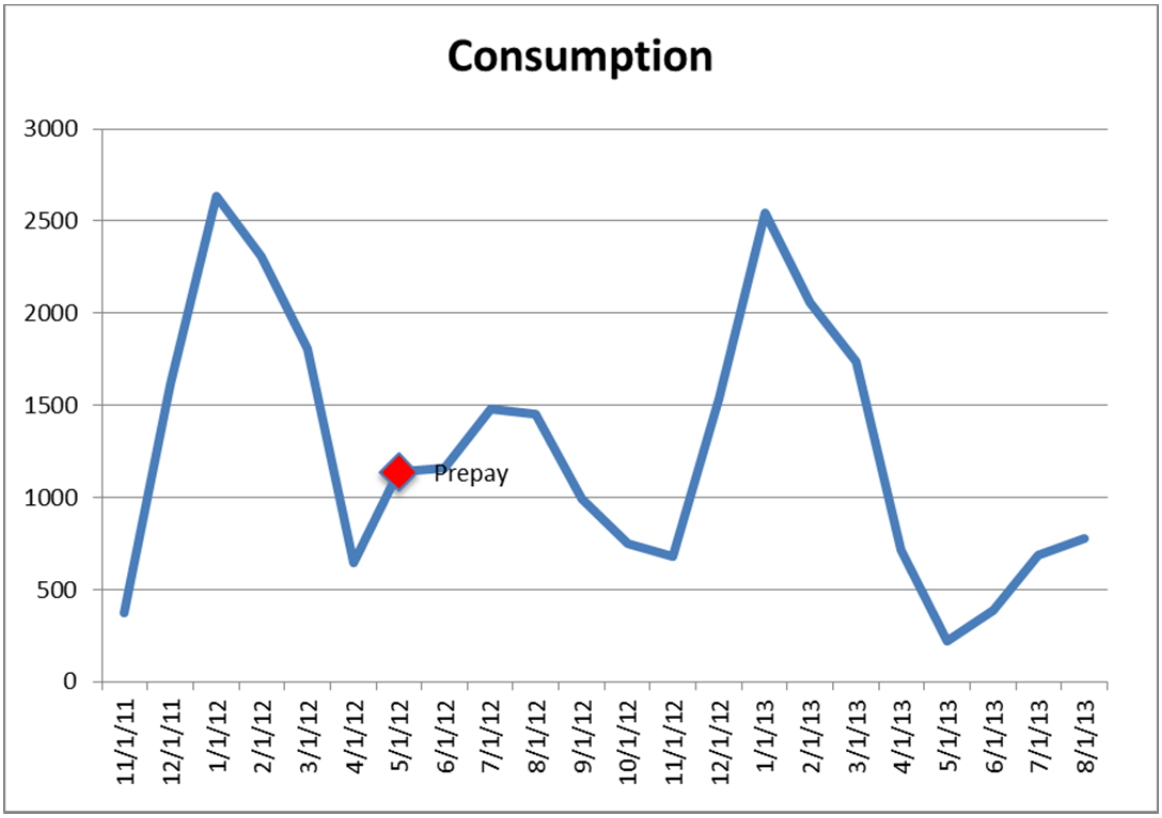

Figure 11. Electricity Consumption of One Account Before and After Joining Prepayment Program

As can be seen, no realistic conclusions can be made other than the usage appears remarkably similar both before and after enrolling in the Prepayment Program.

Customer Survey Results

To investigate the impact of prepayment on customers, a survey was conducted. Customers who were in the EU EnergyAdvantage program were asked to participate. The survey explored areas of satisfaction, as well as likes and dislikes regarding the program. The framework of the survey included the following:

- Customers making purchases at utility offices that were in the Prepayment Program were asked to complete a survey.
- No compensation was provided for completion of the survey.
- No names or account numbers were recorded during the survey, so the results are anonymous.
- Because of the framework of the survey, there is high certainty that all respondents indeed were EU customers participating in the Prepayment Program.
- A copy of the survey is included in Appendix A.

Length of Service

The first question on the survey asked how long the customer had been on prepayment. The results are shown in **Figure 12**.

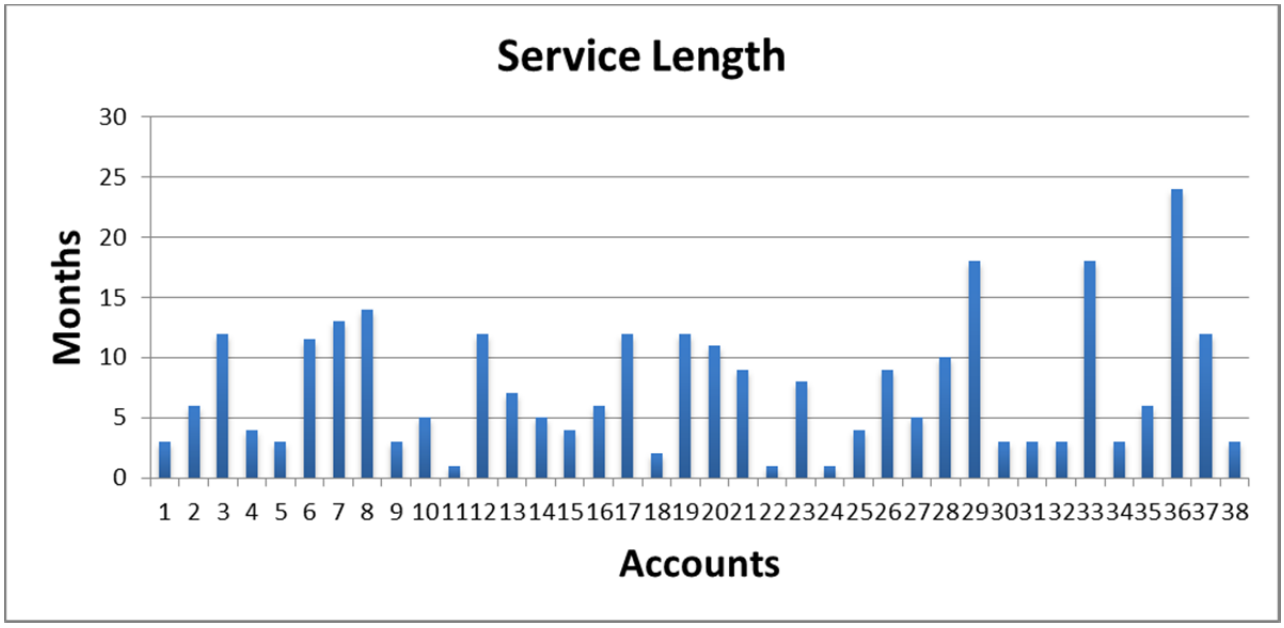

Figure 12. Customer Survey: Time in Prepayment Program

Respondents ranged in service duration from 1 month to 2 years, with the average service period over all the accounts being 7.5 months. Because of the random nature of the sampling and the relatively short time that the program has been offered, this spread of service times was not unexpected.

Overall Satisfaction

The most important question of the survey was to gauge the customer's overall satisfaction with the program. Respondents were asked to rate their satisfaction from 1 to 5, with 5 being the highest satisfaction and 1 being the lowest. The results from that question are shown in **Figure 13.**

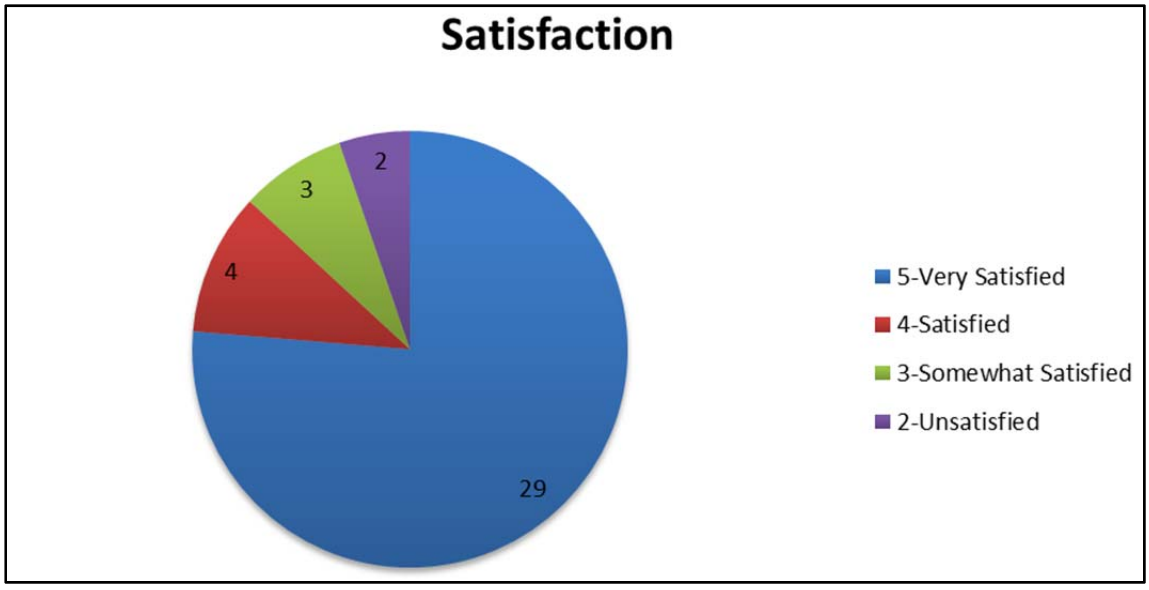

Figure 13. Customer Survey: Overall Satisfaction with Prepayment Program

As shown in the figure, 29 of the 38 respondents were highly satisfied with the program (76%). By combining the Satisfied and Very Satisfied groups, the overall approval numbers go to 33 of 38 (87%). This is in keeping with surveys done by other utilities—overall satisfaction rarely drops below 85%.

Reasons for Choosing Prepayment

The next question attempted to identify the main reason for selecting prepayment as the customer's billing method. This was an open-ended question, to allow respondents as much leeway as possible to articulate their reasons. The results of the question are shown in **Figure 14**.

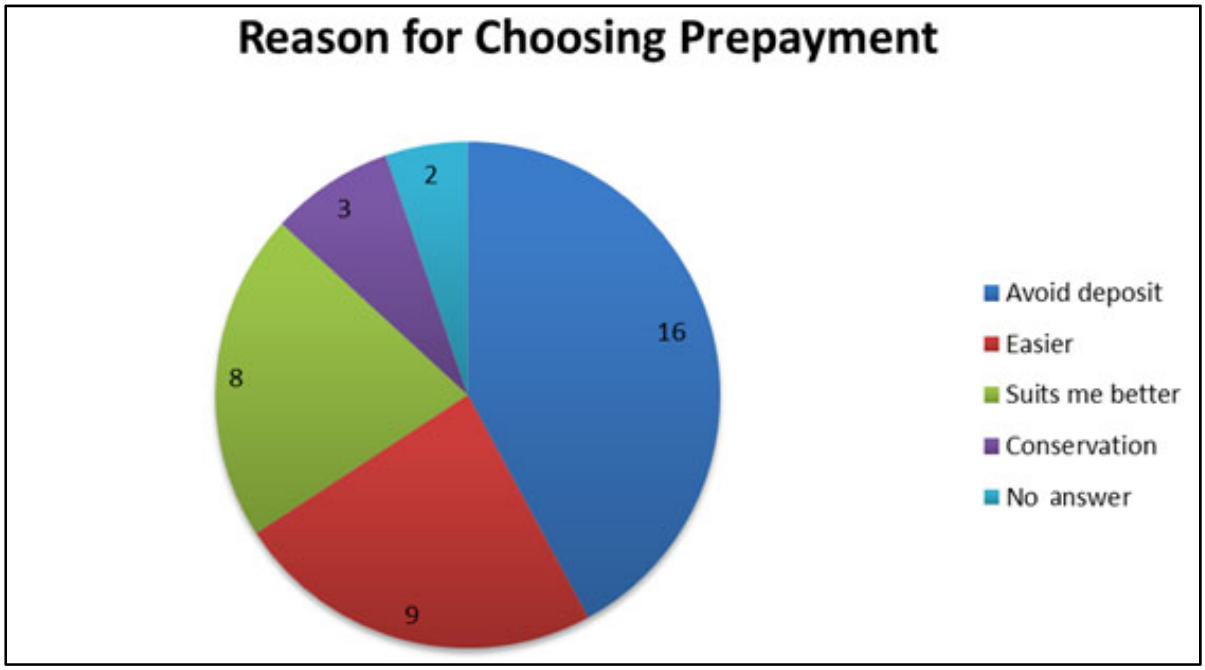

Figure 14. Customer Survey: Reason for Choosing Prepayment Program

Because of the way that EnergyUnited has positioned its program, it is not surprising that the largest number of respondents mentioned the ability to avoid paying a deposit as their main reason for selecting prepayment. It also should be noted that there is likely some overlap with the "Easier" category, in that some respondents considered avoiding a deposit to be easier than having to pay one.

Included in the mix were other noteworthy responses, such as "Conservation" and "Suits me better." These are important categories; they show that prepayment does allow customers to feel more empowered, and that the utility is providing services that better fit their needs.

Saving Money

The question that is always crops up with prepayment is whether or not customers feel they are saving money. The distinction here is the word feel. Because these responses were anonymous, and the fact that many—if not most—of the customers in the Prepayment Program at EU are new customers, there is no real way to determine whether they are paying less for their electric

service or not. Therefore, the survey sought an understanding of how customers feel about the service. The results of the survey are shown in **Figure 15**.

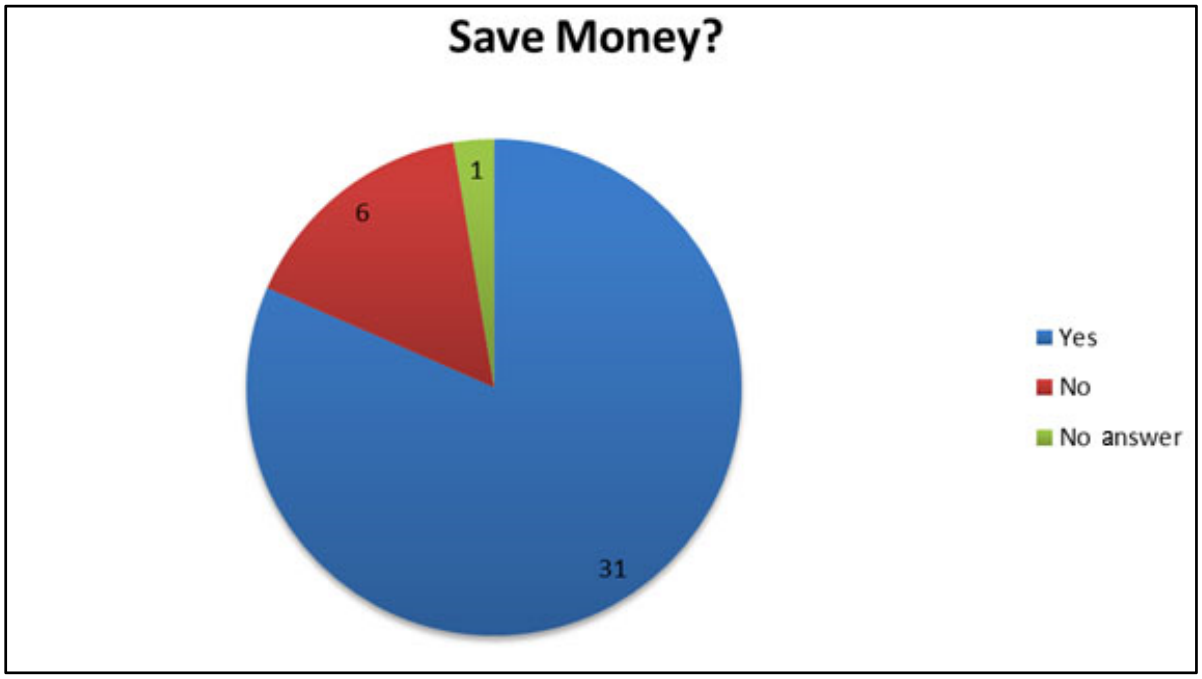

Figure 15. Customer Survey: Perceived Savings Through the Prepayment Program

A total of 31 out of 37 (84%) of respondents said they believed they had saved money through the Prepayment Program. This is a significant response, since EnergyUnited has a reconnect fee of $25 to resume service after disconnect. It was not expected that the response to this question would be so positive. What is not known is if or how many times any of the respondents have been disconnected and have had to pay the $25 reconnect fee. However, this perception of saving money is obviously strong.

Easier to Pay

Because one of the benefits of prepayment is seen to be its much more flexible payment schedule, the survey also asked whether the respondents felt that it was easier for them to pay their bills. The results are shown in **Figure 16**.

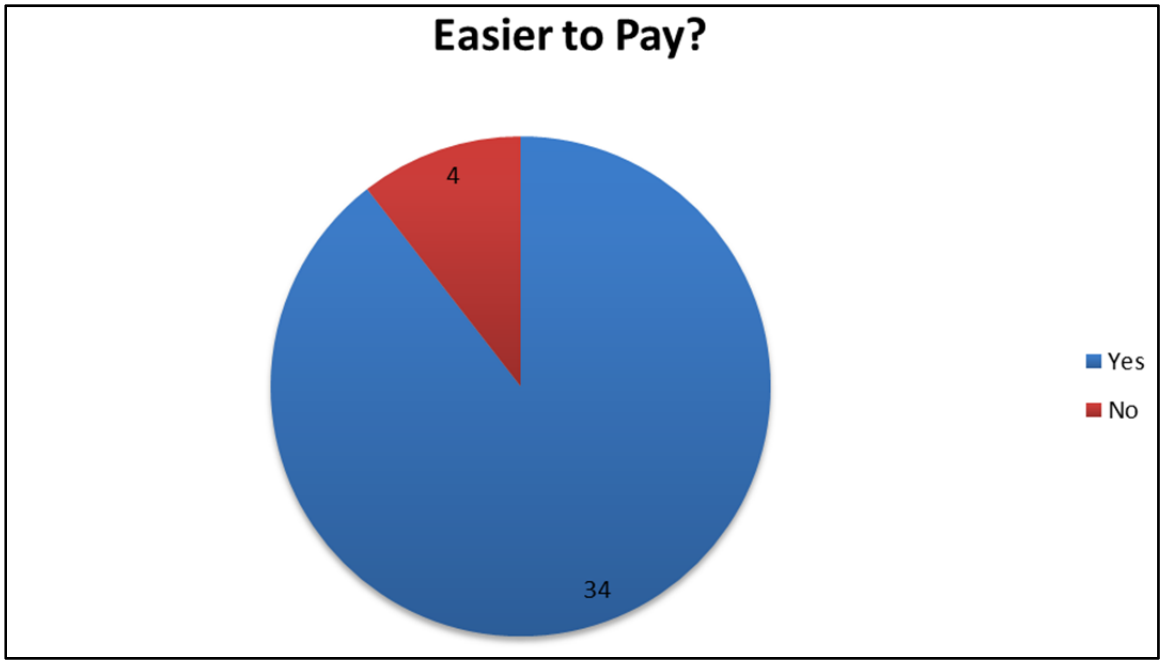

Figure 16. Customer Survey: Ease of Payment Through the Prepayment Program

A total of 34 out of 38 (89%) respondents said that it was easier for them to make payments through the Prepayment Program. This would seem to indicate that even the one respondent who was only "Somewhat Satisfied" with the program in response to the earlier survey question did believe that it was easier to make payments (34 out of 38 thought it to be easier, versus 33 out of 38 who were "Satisfied" or "Very Satisfied"). However, a closer look at the survey results shows that there is actually no correlation between these questions. Of the four respondents who said that it was NOT easier to make payments through the Prepayment Program, their corresponding satisfaction ratings are shown in **Table 4**.

Table 4. Customer Survey: It Was Not Easier to Make Payments Through the Prepayment Program

Respondents Saying it Was NOT Easier to Make Payments
5 – Very Satisfied
4 – Satisfied
4 – Somewhat Satisfied
2 – Unsatisfied

What this means is that three of the respondents to this question did not think it was easier to make payments in the program but still were "Satisfied" or better. It also means that three of the 34 positive respondents to this question still were not "Satisfied" or better in their overall appraisal of the program.

Purchase Frequency

The following data show the purchase frequency of the surveyed accounts. As can be seen from the chart, the survey results very closely mimic the data provided by EnergyUnited. As shown in **Figure 17**, the bulk of the surveyed members purchase either weekly or biweekly.

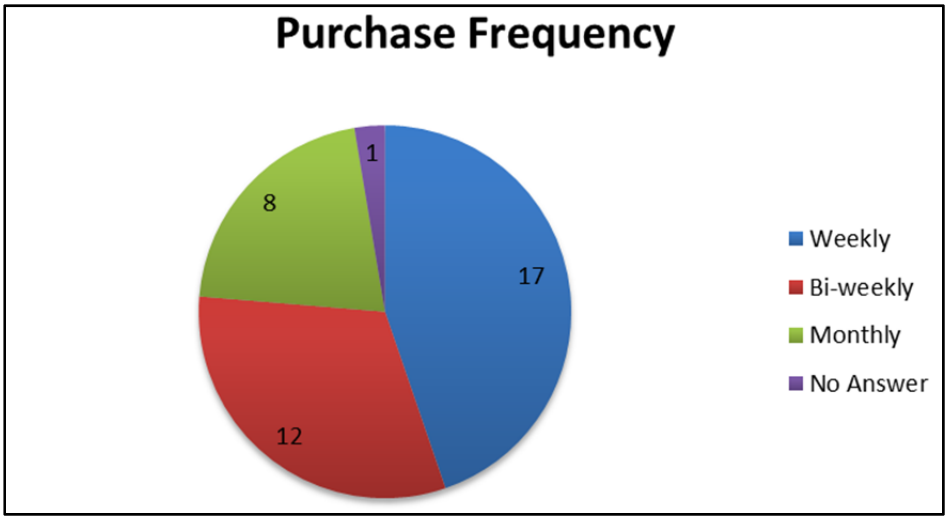

Figure 17. Customer Survey: Purchase Frequency in Prepayment Program

Biggest "Like"

The data in **Figure 18** show the results for the survey question asking about the biggest "like" about the program.

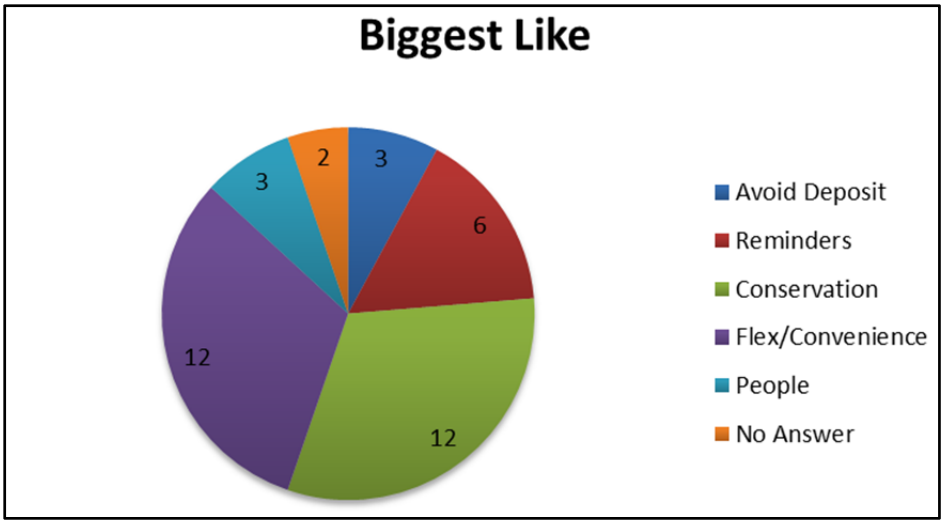

Figure 18. Customer Survey: Biggest "Like" About the Prepayment Program

The interesting thing about the results of this question is that it seems to suggest that, while many people chose prepayment to avoid the deposit, other benefits become apparent that surpass mere deposit avoidance.

Biggest "Dislike"

Figure 19 shows the results of the question asking members to specify their biggest dislike about the program.

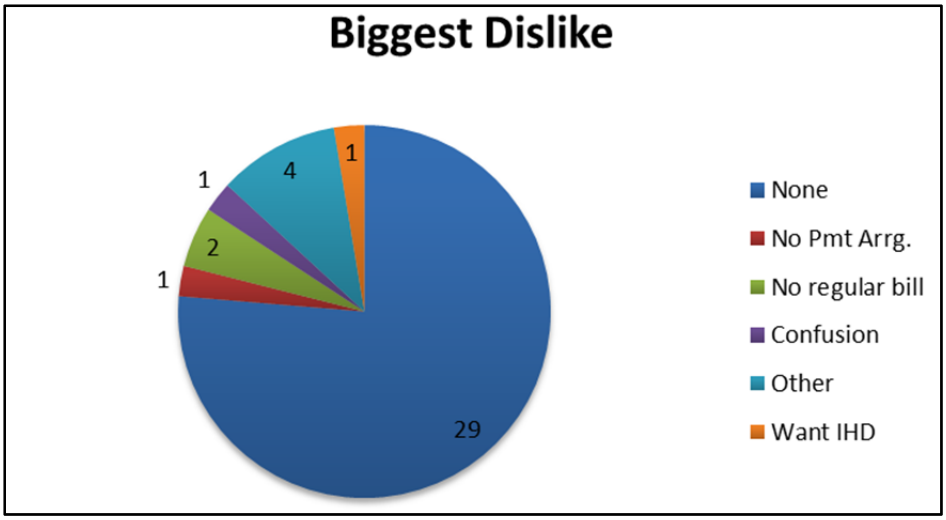

Figure 19. Customer Survey: Biggest "Dislike" About the Prepayment Program

The most significant thing about this result is that, overwhelmingly, members have virtually no complaints about the Prepayment Program. This is especially interesting, given the rules around reconnects, such as fees and minimum balances.

Additional Comments

The last question on the survey simply asked the participants if they had any other comments. The results of this question are as shown in **Figure 20**.

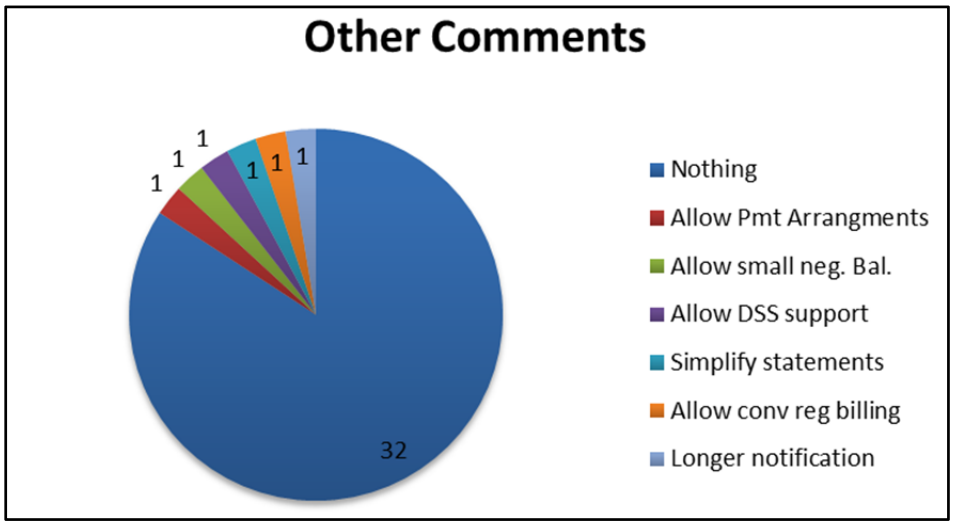

Figure 20. Customer Survey: Additional Comments

Once again, only some of the individual suggestions are noted. Most people surveyed did not make any additional comments.

CONCLUSION

EnergyUnited has created a very effective Prepayment Program that is serving its new members in a way that seems to have generated high levels of satisfaction. While the policies of the program do not necessarily provide a means of debt retirement for existing customers, they do stem the tide of new debt being incurred.

By working with Cayenta, its CIS vendor, to develop prepayment functionality, EnergyUnited chose an implementation methodology that is sustainable, scalable, and avoids additional systems and integrations. For the program to grow much beyond its current size, however, the overhead of manual processing of disconnects and reconnects must be addressed. Most other programs do not have this issue. It is a testament to the diligence of EU personnel that they have been able to keep up with the operations of the program at its current size.

DMEA and KEA are on the cusp of beginning their programs. The proposed policies for these programs are typical when compared to other, more mature prepayment programs at other utilities. The fact that DMEA does not currently have a deposit does cloud the process by which new members would sign up for service.

Conservation Impacts

It is reasonably clear that some customers perceive that they conserve energy AND also save money. However, the data gathered in this study do not prove that premise statistically. Other studies have pointed to energy savings in the range of 8% to 15%. One of the original goals of this study was to show energy savings and efficiency based on customer usage for at least a year before and after switching to prepayment. This timeframe was expected to answer the following questions:

- Is energy conservation a temporary benefit or does it last beyond the first few months?
- Is energy conservation seasonal, in that conservation occurs only when customers' bills tend to be higher?
- What are the energy conservation results with respect to weather variations?

To answer these questions, we will need to take a more controlled approach to the data gathering to make sure that we identify customer accounts that:

- Have a suitable amount of meter data history prior to switching to prepayment.
- Do not and have not moved for the duration of the study.
- Have not materially changed their power usage due to additions or changes in residence infrastructure.
- Have not significantly changed their lifestyle during the study.

It would be very useful to revisit both the DMEA and KEA programs in 2014 to engage in such a study.

Summary

In general, the results of this investigation further corroborate the basic tenants of prepayment as stated in the Prepaid Metering Analytical Report of June, 2012, including the following:

- Members have a high degree of satisfaction with the service.
- Members appreciate the alternative to the typical deposit requirement for new service.
- Prepayment has become a more implementable option, as existing AMI and CIS vendors now more readily support the service.

- Prepayment does promote better energy awareness.
- Prepayment can be effective and successful based on a variety of policy decisions.

What cannot yet be proven or disproven with this set of utilities and this report are the following:

- Prepayment is an effective tool in the area of energy efficiency and conservation.
- Prepayment can be effectively implemented regardless of the local weather climate (although prepayment has been present in Alaska and Canada for years).

In summary, the evolution of prepayment has reached the point at which most utilities should at least be considering developing a program. The evidence suggests that utilities can tailor the program to meet their specific needs without compromising its overall success and the satisfaction of the membership.

APPENDIX A – CUSTOMER SURVEY

EnergyAdvantage Program Member Survey

The following is a survey for EnergyAdvantage customers. Information gathered will be used to publish a report on the effectiveness of the program.

1. How long have you been using EnergyAdvantage? _____
2. How would you rate your overall satisfaction with EnergyAdvantage? (1-low, 5-High) 1 2 3 4 5
3. What is the reason that you are on the EnergyAdvantage program?

   _____

   _____

4. Has EnergyAdvantage allowed you to save money on your bill? (Circle One) Yes No
5. Has EnergyAdvantage made it easier for you to pay for your electric usage? (Circle One) Yes No
6. How often do you make purchases on Energy Advantage? Daily Weekly Two Weeks Monthly
7. What is the biggest thing you like about EnergyAdvantage?

   _____

   _____

8. What is the biggest thing you dislike about EnergyAdvantage?

   _____

   _____

9. If possible, what would you change about EnergyAdvantage?

   _____

   _____

10. Please add any other comments you have about the EnergyAdvantage Program.

    _____

    _____